Hunt, Jeff

From: Johnston, Jeff (ECY) [jefj461@ECY.WA.GOV]
Sent: Friday, April 05, 2013 10:15 AM
To: Hunt, Jeff
Cc: sclo461@ECY.WA.gov; Otterson, Sally (ECY); Perez, Richelle (ECY)
Subject: Tacoma-Pierce 2008 EI - supporting emails
Attachments: FW: Request for 2011 State of Washington Data 2 of 3; FW: 2011 Data Request for Washington State 1 of 3; FW: UPRR Estimated Fuel Consumption Washington State 2011 3 of 3

Jeff,

As a follow-up to our discussion about the locomotive emissions in the Tacoma-Pierce County PM2.5 nonattainment area emissions inventory, I've attached the 3 emails and their attachments cited in the emissions inventory endnotes (endnotes 26, 27 and 28).

You also asked for a brief description of how the emissions were calculated, based on the information provided by the rail companies.

UPRR (minus SO2) and BNSF submitted emissions for calendar year 2008 and were broken up into Line Haul and Yard Locomotives where applicable. Amtrak submitted track and fuel consumption data for 2008 and emissions were calculated using EPA's Emission Factors for Locomotives (EPA-420-F-09-025). SO2 emissions were estimated for both UPRR and Amtrak using EPA's Emission Factors for Locomotives (EPA-420-F-09-025) equation:

SO_2 (g/gal) = (fuel density) × (conversion factor) × (64 g SO_2/32 g S) × (S content of fuel)

The fuel density and sulfur content of fuel are based on inputs described in the NONROAD technical document NR-009c (http://www.epa.gov/otaq/models/nonrdmdl/nonrdmdl2004/420p04009.pdf).

Total emissions can be calculated by multiplying the emission factors (in g/gal) by the fuel consumption rates (in million-gal/yr) to give annual emission rates (in metric tons per year). Multiplying this metric estimate by 1.102 gives standard U.S. tons (or short tons) per year (EPA-420-F-09-025).

I hope this provides the information you're looking for. Please contact me or Sarah Clouse if you have any questions about this information.

Best,

Jeff

Jeff Johnston, Ph.D. | Manager, Science & Engineering Section
Air Quality Program | Washington Department of Ecology
jeff.johnston@ecy.wa.gov | 360.407.6115 | Cell 360.628-4511 | Fax 360.407.7534
PO Box 47600 | Olympia, WA 98504-7600 | STREET: 300 Desmond Drive SE | Lacey, WA 98503-1274